

# **AVISTART 2501**

Remote Engine Starter System

## **Installation Manual**



**AVITAL**

**A DIVISION OF  CLIFFORD ELECTRONICS**



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## ***Important Information***

### **Recommended Installation Tools**

Voltmeter  
Wire Strippers  
Electrical Drill & Bits  
Phillips Screwdriver  
Convolute Tubing \*  
Solder Gun \*  
Wire Crimpers  
Shrink Tube or Electrical Tape

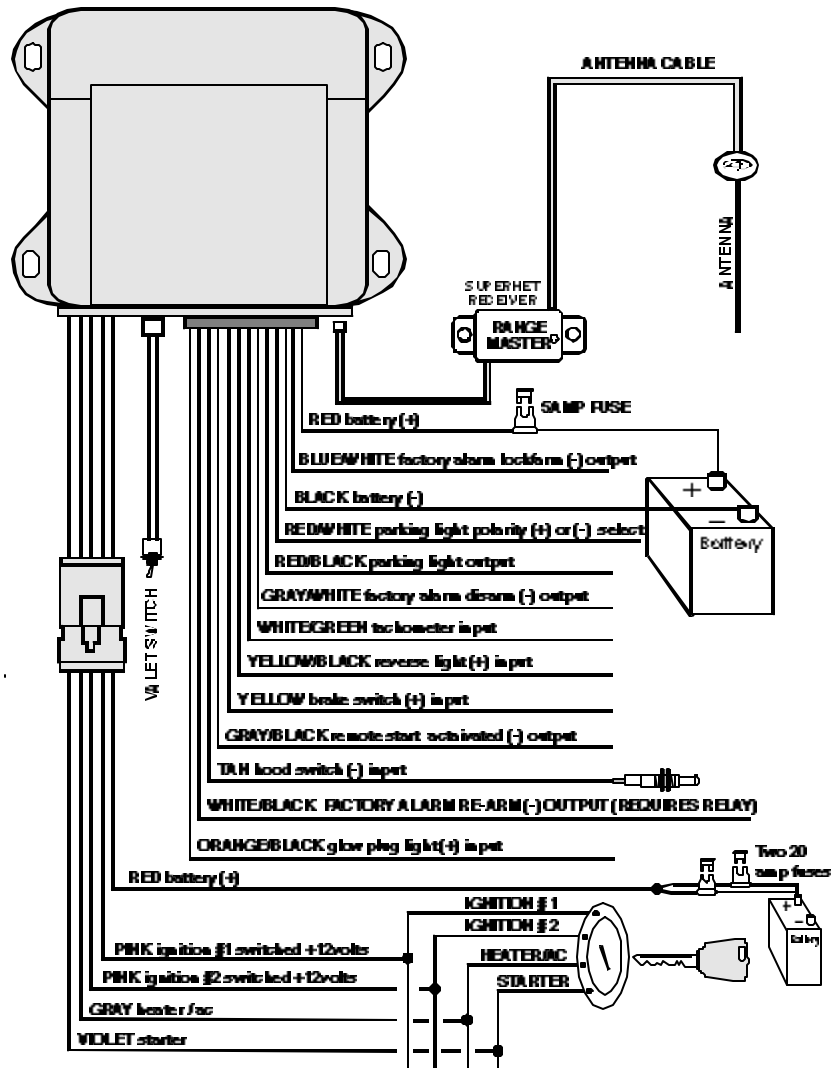
*\* Optional*

### **Recommended Procedures**

1. Test all circuits with a voltmeter.
2. Make all wiring connections with the supplied solderless crimp connectors. DO NOT twist wires or use scotch-lok connectors.
3. Route the small and large **RED, RED/WHITE** and **BLACK** wires from the control unit directly to the battery.
4. Keep extensions as short as possible. Use same gauge wires for short extensions and larger gauge wires for longer extensions.
5. DO NOT disconnect the battery cables. Make all connections by removing the bolts from the cable clamps without detaching the clamp.
6. Turn off dome light or remove dome light fuse to prevent battery drain.

***This device complies with Part 15 of the FCC rules. Any changes or modifications made to the system without the express approval of Avital Technologies, Inc. could void the user's authority to operate this equipment.***

## Main Wiring Diagram



### 14 Pin Connector

Pin Number	Wire Color	Description
1	BLUE/WHITE	Lock (-) Output
2		Not Used
3	ORANGE/BLACK	Glow Plug Light (+) Input
4	WHITE/BLACK	Dome Light (-) Output for Factory Alarm Rearming
5	BLACK	Battery (-)
6	WHITE/GREEN	Tachometer Input
7	YELLOW	Brake Switch (+) Input
8	YELLOW/BLACK	Reverse Light (+) Input
9	TAN	Hood Switch (-) Input
10	RED/BLACK	Parking Light Output
11	GRAY/BLACK	Remote Start Activated (-) Output
12	GRAY/WHITE	Factory Alarm Disarm (-) Output
13	RED/WHITE	Parking Light Polarity Input (+) or (-) Select
14	RED	Battery (+)

### 6 Pin Connector

Pin Number	Wire Color	Description
1	PINK	Ignition Output
2	RED	Battery +12 Volts
3	PINK	Ignition Output
4	VIOLET	Starter Output
5	GRAY	Heater/AC Output
6		Not Used

## ***Installation Procedures***

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### **Control Unit**

1. Select a location under the dash that will allow you to use the tie wraps to securely fasten the control unit.
2. Mount the control unit as high as possible to ensure maximum security.
3. Do not mount the control unit near moving parts.
4. Avoid areas that are in the direct path of air blowing from the vents.
5. Route wires from this point, leaving slack for ease of service.

### **RangeMaster™ Super Heterodyne Receiver Module**

1. Plug the receiver module **WHITE** connector into the control unit **WHITE** plug.
2. Use tie wraps to fasten the receiver module as far from the control unit as possible.
3. Route the antenna cable up through the driver side windshield pillar, behind the headliner and behind the rear view mirror.
4. Fasten the antenna to the windshield with the attached adhesive tape. Attach the antenna vertically so the rubber tip on the end of the antenna is facing downward.

### **Wireloom**

1. Plug the wirelooms securely into the control unit.
2. Route wires from the control module directly to each connection point.
3. Separate the small and large **RED**, **RED/WHITE**, **BLACK**, **TAN**, and **WHITE/GREEN** wires.
4. Sleeve these wires with vinyl tubing or electrical tape and route them through an existing rubber grommet into the engine compartment.
5. If an existing grommet is not available, drill a hole and install a snap grommet.

### Valet Switch

1. Discuss placement with the owner.
2. Choose a location for the valet switch that is hidden, but convenient for the owner to access.
3. Drill a 1/4" hole and mount the switch.
4. Route the valet switch wires to the control unit.
5. Plug the valet switch **WHITE** connector into the control unit **WHITE** plug.

### Brake Lights (Mandatory)



**CAUTION :** As a safety feature, the unit monitors the brake light to prevent an unauthorized driver from driving the car and to switch to normal engine operating condition. For this reason, the **YELLOW** brake light input wire must be connected and the brake light must be in working condition or the remote start will not operate properly.

1. Turn the ignition key to the "ON" position, then press the brake pedal and make sure the brake light illuminates.
2. Use a voltmeter to find the one wire at the brake light switch (usually located on the upper brake pedal arm) that shows +12 volts when you press the brake pedal and 0 volts when the brake pedal is not pressed.
3. Connect the **YELLOW** wire to the vehicle brake light switch wire.

### Parking Lights

1. If the parking lights are positive trigger, connect the **RED/WHITE** wire to the battery positive (+) terminal through the 20 amp fuse assembly.  
**NOTE: Do not connect the RED/WHITE wire to the control unit RED wire.**
2. If the parking lights are negative (-) trigger, connect the **RED/WHITE** wire to control unit **BLACK** wire.
3. Connect the **RED/BLACK** wire to the vehicle parking light wire.

### Glow Plug Light Input

The AviStart can start a diesel engine by one of two methods.

#### **Pre-ignition**

The module can be programmed to turn the ignition "ON" for 15 seconds before the starter engages. This will allow the glow plugs time to warm up and the glow plug light to turn off.



### **Glow Plug Light Monitoring**

The glow plug light (+) input wire will monitor the glow plug light in the dashboard. When a remote start is attempted, the ignition will turn on and when the glow plug light turns "OFF" the engine will start

1. Locate the glow plug light wire that will show (+) 12 volts while the ignition key is on and the glow plug light wire is illuminated.
2. Connect the AviStart **ORANGE/BLACK** wire to the vehicle glow plug light wire.

**NOTE: Do not use both "pre-ignition" and "glow plug light monitoring" at the same time (use one or the other).**

### **Reverse Light**



**CAUTION:** Some vehicles allow you to remove the gear shift selector from "Park" even while the ignition key is not on. As a safety feature, the system will monitor the reverse wire. If the vehicle is removed from "Park" while in the remote start mode, the system will shut down immediately.

1. Set the parking brake.
2. Turn the ignition key to the "ON" position and adjust the gear shift selector to "Reverse."
3. Use a voltmeter to find the wire that will show +12 volts in "Reverse" and 0 volts in "Park."
4. Connect the **YELLOW/BLACK** wire to the vehicle's reverse light wire.

### **Remote Start Activated (-) Output**

The **GRAY/BLACK** wire will provide a continual ground output for as long as the vehicle is in the remote start mode. This output can be used for additional ignition, starter or heater/AC relays, VATS, Passlok and Passkey bypass.

### **Factory Alarm Disarm (-) Output**

The **GRAY/WHITE** wire will provide a 0.75 second ground output when the START button is pressed.

1. Arm the vehicle factory alarm system.
2. Use a volt/ohmmeter to locate the one wire that will show ground only when the driver door key cylinder is held in the unlock position.

*Continued on next page.*

***NOTE: Most factory alarm/disarm wires will show 8-12 volts while armed. A few vehicle disarm wires will rest at a neutral state while armed. Regardless of type, both types will change to ground when the key cylinder is turned to unlock.***

3. Connect the **GRAY/WHITE** wire to the factory alarm disarm wire.

### **Factory Alarm Rearm**

There are two types of factory alarm systems that the AviStart can rearm.

#### **System #1**

This type of system has a designated alarm arm wire that requires a (-) pulse to arm the alarm

1. Use a volt/ohmmeter to find the factory arm wire that will show (-) ground while the driver door key cylinder is turned to the "LOCK" position.
2. Connect the AviStart **BLUE/WHITE** wire to the vehicle arm wire. The **BLUE/WHITE** wire will provide a single 2-second (-) output five seconds after the engine is shut off with the remote control or timed out.

#### **System #2**

This type of system does not have a designated "arm" wire. To arm the alarm, you must lock the doors while the interior lights are on.

1. Use a volt/ohmmeter to locate the vehicle lock switch wire. If the vehicle lock wire is not (-) trigger, you will need to add a relay.
2. Connect the AviStart **BLUE/WHITE** wire to the vehicle (-) lock wire or additional lock relay.
3. Use a volt/ohmmeter to find the vehicle interior light wire. It will be (+) or (-) trigger.
4. A relay will be required to turn on the interior lights. Connect the AviStart **WHITE/BLACK** wire to relay terminal 85. Connect relay terminal 86 to +12 volts. Connect relay terminal 30 to the vehicle interior light wire. If the interior lights are (-), connect relay terminal 87 to (-) ground. If the interior lights are (+), connect relay terminal 87 to (+) 12 volts.

### **Ignition Switch Connections**

***NOTE: Because these wires can draw high current, we recommend that they be soldered and shrink tubed or taped. If only one 14 ga PINK wire is needed, tape the end of the second 14 ga PINK wire to prevent a short circuit.***

### **Ignition #1 Ignition #2**

The AviStart module has two onboard 30-amp relays. Most vehicles have only one ignition wire necessary to start the vehicle. Some vehicles have two ignition wires. Make all wire connections at the ignition switch wire harness.

1. Use a voltmeter to locate the wire(s) that show +12 volts while the ignition key is in the "ON," "CRANK" and "RUN" positions and 0 volts when the ignition key is in the "OFF" position.
2. Connect the 14 ga **PINK** wire(s) to the vehicle ignition wire(s).

### **Heater/AC**

The AviStart module has one onboard 30-amp relay. Most vehicles have only one heater/AC wire. If additional heater/AC wires are required to activate the vehicle's heater/AC system, an additional 30-amp relay must be added. Do not use the **GRAY** wire to power more than one heater/AC wire.

1. Use a voltmeter to find the wire(s) that show +12 volts when the ignition key is in the "ON" position, 0 volts while the starter is cranking and +12 volts while running.
2. Cut this wire in half. Start the vehicle and turn the blower switch on. The blower should not turn on.
3. Connect the **GRAY** wire to the heater/AC wire.

### **Starter**



**WARNING:** Review the "Safety Bulletin" and diagrams on pages 10-12 prior to installing the starter system.

1. Use a voltmeter to find the wire that shows +12 volts while the ignition key is in the "CRANK" position **only** and 0 volts while the key is in the "OFF," "ON" and "RUN" positions.
2. Connect the **VIOLET** wire to the starter wire.

## **Remote Engine Start Neutral Safety Switch Bulletin**

A neutral safety switch is a mechanism on almost every vehicle equipped with an automatic transmission. The neutral safety switch prevents the vehicle from starting while the gear shift selector is in "Reverse" or "Forward" gear positions. There are basically two types of neutral safety switches. The most common is the mechanical (separate) neutral safety switch. A small group of vehicles use a combined neutral safety switch.

### **Type "A" (separate)**

The mechanical neutral safety switch is located between the ignition switch and the starter solenoid. The starter wire runs directly from the back of the ignition switch to the neutral safety switch and then to the starter solenoid. When adding a remote engine starter, make starter wire connections as close to the ignition switch as possible to ensure your connections are between the ignition switch and the neutral safety switch.

### **Type "B" (combined)**

Some vehicles combine the neutral safety switch and the steering column shift mechanism together. The starter wires run from the "combined" switch directly to the starter solenoid. The remote start wire connection cannot be made between the ignition switch and the neutral safety switch. As a result, if the vehicle was left in gear with the key in the ignition and not in the locked position, the vehicle could move forward or backward if a remote start attempt was made.

The combined type neutral safety switch requires an additional relay to prevent the vehicle from remote starting while the key is in the ignition. Use the attached test procedure and relay wiring diagrams. Install the complete remote start unit and test all safety features before conducting the test procedure.

Currently, the only vehicles with the combined neutral safety switch that Avital is aware of are General Motors trucks, GM sport utility vehicles, GM column shift passenger cars and Dodge Dakota pickup trucks. There may be additional vehicles with the combined neutral safety switch that require the additional relay.

***NOTE: Use the following test procedure upon completion of every remote start regardless of the make and model of the vehicle.***

### **Test Procedure**



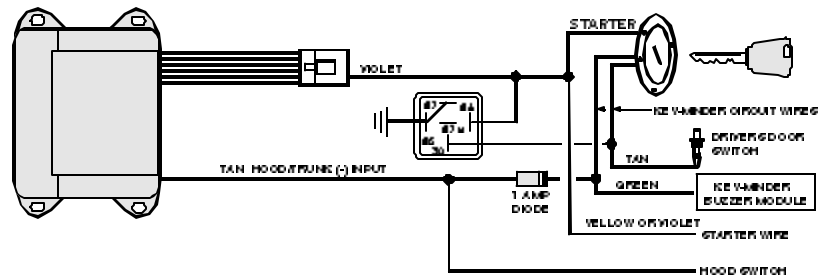
**CAUTION:** Be sure there is at least 5 feet of unobstructed clearance at the front and rear of the vehicle. Make sure to alert anyone near the vehicle you are testing that the vehicle may move forward slightly.

1. Apply the parking brake.
2. Turn the ignition key to the "ON" position and place the vehicle in "DRIVE."
3. Turn the ignition as close to the "OFF" position as possible. (Most vehicles will not allow the key to turn off completely.)
4. Place your foot over the brake pedal without touching it. Be prepared to step on the brake if the starter engages.
5. Activate the remote engine starter.
6. If the vehicle starter engages, immediately press the brake pedal to disengage (shut down) the remote start. You have a "combined" type neutral safety switch and you will have to add an additional relay as shown in the diagram.
7. If the vehicle starter does not engage, no additional relays are required.

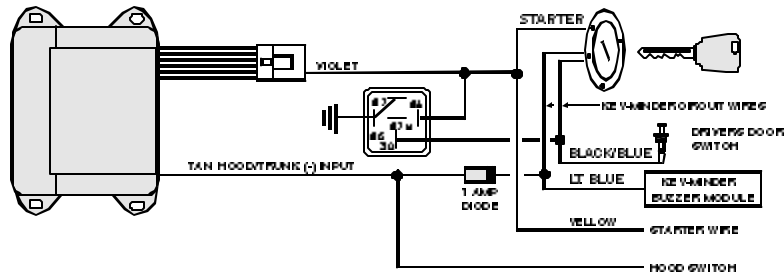
All vehicles have a "key in the ignition" reminder circuit (key minder) that will sound a chime or buzzer while the key is in the ignition and the driver's door is open. The following diagrams will illustrate how to interface the key-minder wires and a relay to prevent the vehicle from remote starting while the key is in the ignition.

The wire color codes are subject to change. Check all wires with a volt/ohmmeter. If you have any questions, please contact the Avital Technical Support Department.

*General Motors Sport Utility Vehicles, Trucks and  
Column Shift Passenger Vehicles*



*Dodge Dakota Pickup Trucks*



### **Tach Wire (RPM Monitoring)**

The AviStart is designed to monitor the vehicle RPM by connecting directly to the vehicle tachometer wire which is usually located at the distributor, ignition coil or diagnostic plug. On most vehicles, the tach wire is easily accessible. If the tach wire is not accessible, there are several alternative choices. Contact Avital Technical Support Department for alternate choices.

The following procedure for testing the vehicle tach wire is not exact and may vary with different vehicle make, model and year. We recommend that you refer to your AviFax documents for tach color code and location information.

1. Set your voltmeter to the AC voltage scale.
2. Start the vehicle. Use the voltmeter to find a wire that will show 1 to 5 volts AC while the vehicle is idle and increase an additional 1 to 5 volts AC when the engine RPM is raised to 3000-4000 RPM.
3. Connect the **WHITE/GREEN** wire to the vehicle tach wire.

### **Hood Switch (Mandatory)**

As a safety precaution, the hood switch prevents the vehicle from starting when the hood is open. If the vehicle is in the remote start mode and the hood is opened, the remote start will immediately shut down. The hood switch will also trigger the alarm when opened.

1. Choose a location under the hood away from direct exposure to water or water drain areas.
2. Check for proper hood clearance.
3. Make sure the hood switch will make contact with a flat surface on the hood when closed.
4. Drill a  $\frac{5}{16}$ " mounting hole.
5. Mount the hood switch.
6. Connect the **TAN** wire to the hood switch.
7. Make sure the hood makes contact with hood switch when closed and presses the hood switch straight down to prevent wear.

## Power and Ground Connections



**CAUTION:** Do not plug in the system fuses until the final step below.

1. Connect the 18 ga **RED** wire to one end of a supplied 20 amp fuse assembly.
2. If the vehicle parking lights are positive trigger, connect the **RED/WHITE** wire to one end of the other supplied 20 amp fuse assembly.
3. Connect the **BLACK** wire to the 10 mm ring terminal.
4. Connect the 10 ga **RED** wire to one end of both 30-amp fuse assemblies.
5. Connect the other ends of the 18 ga **RED** and **RED/WHITE** wire fuse assemblies to the 10 mm ring terminal.
6. Connect the other end of the 10 ga **RED** wire fuse assembly to the other 10 mm ring terminal.
7. Remove the (+) and (-) battery bolts. Do not disconnect the battery clamps.
8. Connect the empty fuse assemblies to the (+) battery terminal.
9. Connect the **BLACK** wire to the (-) battery terminal.
10. Inspect all wiring. Make sure all wires are connected correctly.
11. Install the 5 amp fuse in the 18 ga **RED** wire fuse assembly.
12. Install the 20 amp fuse in the **RED/WHITE** wire fuse assembly.
13. Install the two 20 amp fuses in the 10 ga **RED** wire fuse assemblies.

## Mandatory RPM Programming

In order to remote start the vehicle engine and prevent over-grinding of the starter motor, the engine RPM must be programmed into the system memory. The AviStart has a built-in piezo beeper for audible programming confirmation.

1. Start the engine with the ignition key. Let the engine warm up until it reaches a normal idle RPM (typically 700-900 RPM).
2. Turn the ignition key "OFF."
3. Start the engine with the ignition key.
4. Within 10 seconds of starting the vehicle, begin flicking the valet switch on then off 5 times (counting the piezo beeps).

**NOTE: Stop on the 5th beep. See the "Programming Table for System Features" on page 16.**

5. Press and hold the remote START button.
6. The parking lights will flash two times to confirm the RPMs have been memorized.
7. Release the START button.



## ***Programmable Features***

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All AviStart system and remote control programmable features are accomplished by turning the ignition key to the "ON" position or starting the engine and flicking the valet switch on and off a preset number of times. The built-in piezo beeper will beep for audible programming confirmation.

The AviStart also allows the user to add new remote controls in one step, delete lost or stolen remote controls or rearrange the factory preset remote control functions.

1. Remove the system from Protected Valet Mode. Programming cannot be accessed while the system is in Protected Valet Mode.
2. Select the feature you wish to program from the "Programming Table for System Features" or the "Programming Table for Remote Controls" on page 16. Note the number of beeps associated with that feature.
3. Turn the ignition key to the "ON" position.
4. Within 10 seconds, begin flicking the valet switch on and off. The piezo beeper will beep once each time you flick the switch on then off.
5. Continue flicking the switch on and off, counting the number of beeps.

***NOTE: Stop when you reach the number of beeps associated with your chosen feature.***

6. Follow the "Secondary Action." You will hear a number of beeps to confirm that you have changed the setting of that feature.
7. Turn the ignition key "OFF."
8. Repeat steps 1-7 for any other feature you wish to program.

**Programming Table for System Features**

Feature	Factory Setting	No. of beeps	Secondary Action
Remote Start Pre-Ignition 2 or 15 Seconds	2 Seconds	4	Wait 3 seconds, the piezo beeper will beep once for 15 seconds, twice for 2 seconds
Mandatory RPM Programming	—	5	See "Mandatory RPM Programming" on page 14.

**Programming Table for Remote Controls**

Feature	Factory Setting	No. of beeps	Secondary Action
Remote Engine Start	Green START Button	6	Press the Green START Button, the piezo beeper will beep 1 times.
Remote Engine Stop	Red STOP Button	7	Press the Red STOP Button, the piezo beeper will beep 2 times.
One Step Remote Control Code Learning	Green START Button	8	Press the Green START Button, the piezo beeper will beep 1 time.
Instant Remote Control Code Deletion	—	9	Wait 3 seconds, the piezo beeper will beep twice, all codes are erased out of memory.



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